I. BARRIER PERMEABILITY TO BROMIDE AND PROTEIN CONTENT OF THE CEREBROSPINAL FLUID*

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THE object of our previous studies on the distribution of bromide and calcium between blood and cerebrospinal fluid was to investigate the function of the barrier between blood and cerebrospinal fluid in various mental diseases.†

CHART I

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The data secured by these studies were used in discussion of the diagnosis and pathogenesis of mental diseases; they were not expected to throw light on the mechanism of the function designated as barrier permeability. The latter obviously depends upon at least the following three factors: (a) the status of the structures constituting the barrier; (b-c) the physicochemical constitution of both blood and cerebrospinal fluid.

In this communication we are essentially interested in the problem whether or not there is any relationship between the protein content of the cerebrospinal fluid and the barrier permeability, as determined by bromide quotients (Walter's test).

Both the barrier permeability to bromide and the total protein content of the cerebrospinal fluid were determined in 340 cases of various mental diseases. The results obtained are summarized in two charts:

Chart I includes 265 cases with total spinal fluid proteins ranging between 10 and 35 mg. per cent., and 75 cases with protein values from 36 to 80 mg. per cent. While in the first group the barrier permeability is increased in 22.1 per cent. of the 265 cases, in the second group the permeability is increased in 50.7 per cent. of the 75 cases. In each of the two groups, however, the percentage of cases with normal permeability is markedly high; there is also in each group a small number of cases with low permeability.

Chart II contains three types of disease, each one subdivided into two groups, according to the total protein content of the cerebrospinal fluid. In the organic psychosis group of 31 cases, with protein values from 10 to 35 mg. per cent., increased permeability is present in 6.4 per cent.; in 11 cases of the same group but with protein contents ranging between 36 and 45 mg. per cent. the permeability is increased in 52.7 per cent. In 73 cases of epilepsy with protein concentrations from 10 to 35 mg. per cent. the permeability is high in 39.7 per cent.; and in 10 cases with protein contents from 36 to 45 mg. per cent. the permeability is high in 60 per cent. In schizophrenia, while the group of 38 cases with low proteins contains a high permeability in 7.8 per cent., there are no cases with high permeability in the group with high proteins. Attention should be paid, however, to the small number of cases (6) in the last mentioned group. It is significant that in epilepsy there is a relatively high percentage of cases with high permeability in the series of cases with low protein contents. It is furthermore noteworthy that in each type of the diseases there are high percentages of cases with normal permeability in both the group of cases with low protein values and the group of cases with high protein values.

Our results show that the relationship between the content of spinal fluid protein and the barrier permeability to bromide is such that high spinal fluid protein and high barrier permeability often go together. That high protein in spinal fluid, however, is only a contributing factor in the determination of high barrier permeability is suggested by our findings in epilepsy and schizophrenia.

CHART II

Sodium Bromide Permeability and Total Protein in Spinal Fluid

■ = P.Q. > 3.3 Decreased Permeability
 □ = P.Q. 2.9—3.3 Normal
 ▨ = P.Q. < 2.9 Increased